

A photograph of a woman with blonde hair, seen from the side, looking down at a newborn baby. The woman's face is partially obscured by a teal overlay. The baby is lying in her arms, looking up. The background is a dark teal color. The text 'The NEST Program' is overlaid in white on a dark horizontal band across the middle of the image.

The NEST Program

A novel program for the reduction of
perinatal substance abuse and treatment of
the drug-exposed newborn.

N Neonatal *abstinenc*
E Evaluation
S Support
T Treatment

William Trawick, NNP-BC
Alaska Neonatology Associates
Mednax Medical Group

The NEST Program at Alaska Regional
Hospital
Anchorage, Alaska



The NEST Program

- I have no actual or potential conflict of interest nor financial concern related to the following presentation.
- Any discussion related to the neonatal use of the following medicines should be considered to be off-label:

| | |
|---------------|------------------|
| Gabapentin | Phenobarbital |
| Clonidine | Morphine Sulfate |
| Buprenorphine | |



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BC WOMEN'S
HOSPITAL+
HEALTH CENTRE



Dr. Ron Abrahams
Director of the BC Women's FIR Square Combined Unit, Vancouver BC

NAS is an expected and treatable outcome for the infant born to a mother who is a habitual user of opiate / opioid substances.

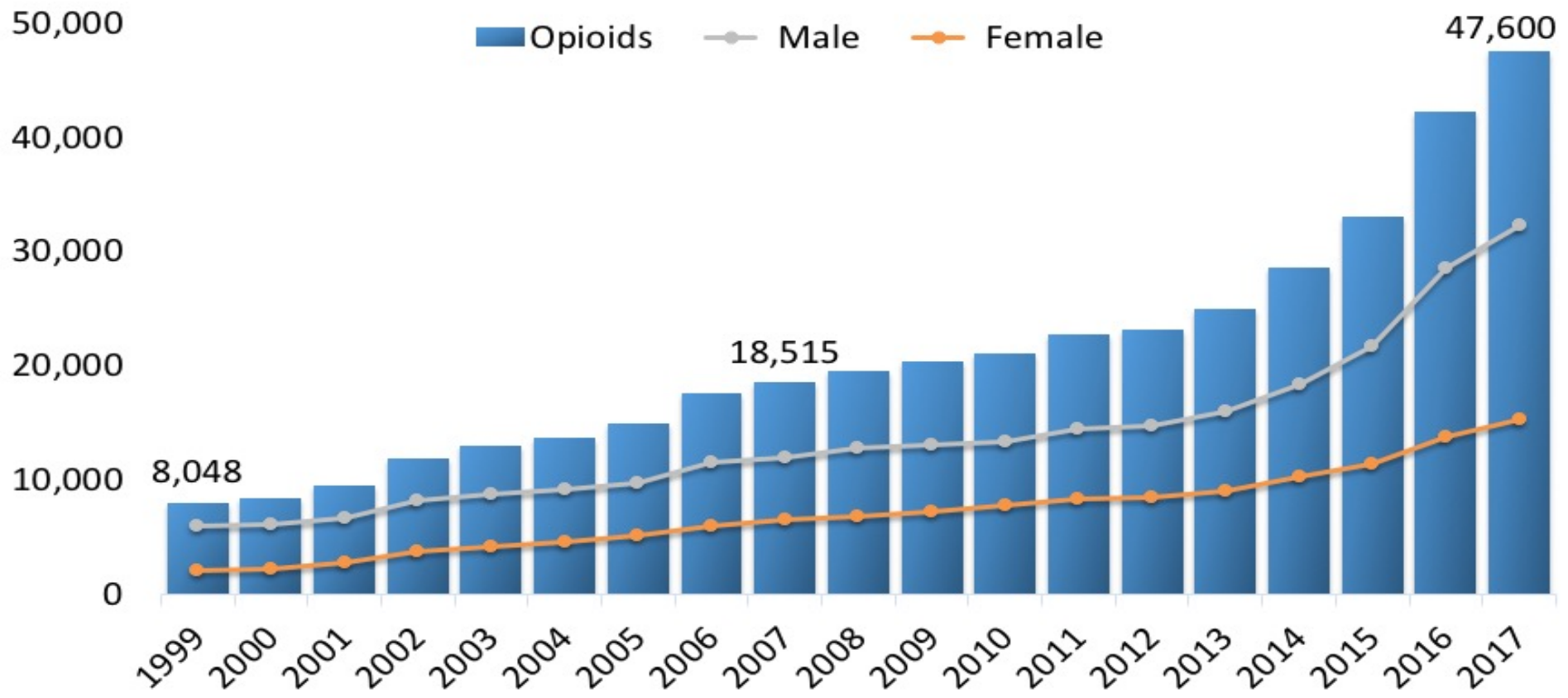
It is also the expected outcome for infants born to a mother who requires medication assisted treatment for opioid use disorder*.

*and that's ok.

The number of women with opioid use disorder at labor and delivery quadrupled from 1999-2014.

- *Haight SC, Ko JY, Tong VT, Bohm MK, Callaghan WM. Opioid Use Disorder Documented at Delivery Hospitalization – United States, 1999-2014. MMWR Morb Mortal Wkly Rep 2018;67:845-849.*

Figure 3. National Drug Overdose Deaths Involving Any Opioid, Number Among All Ages, by Gender, 1999-2017



Source: : Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018

Substance Use in Pregnancy; Effects on the Infant

Crosses the placenta (most do) and thus direct fetal effect:

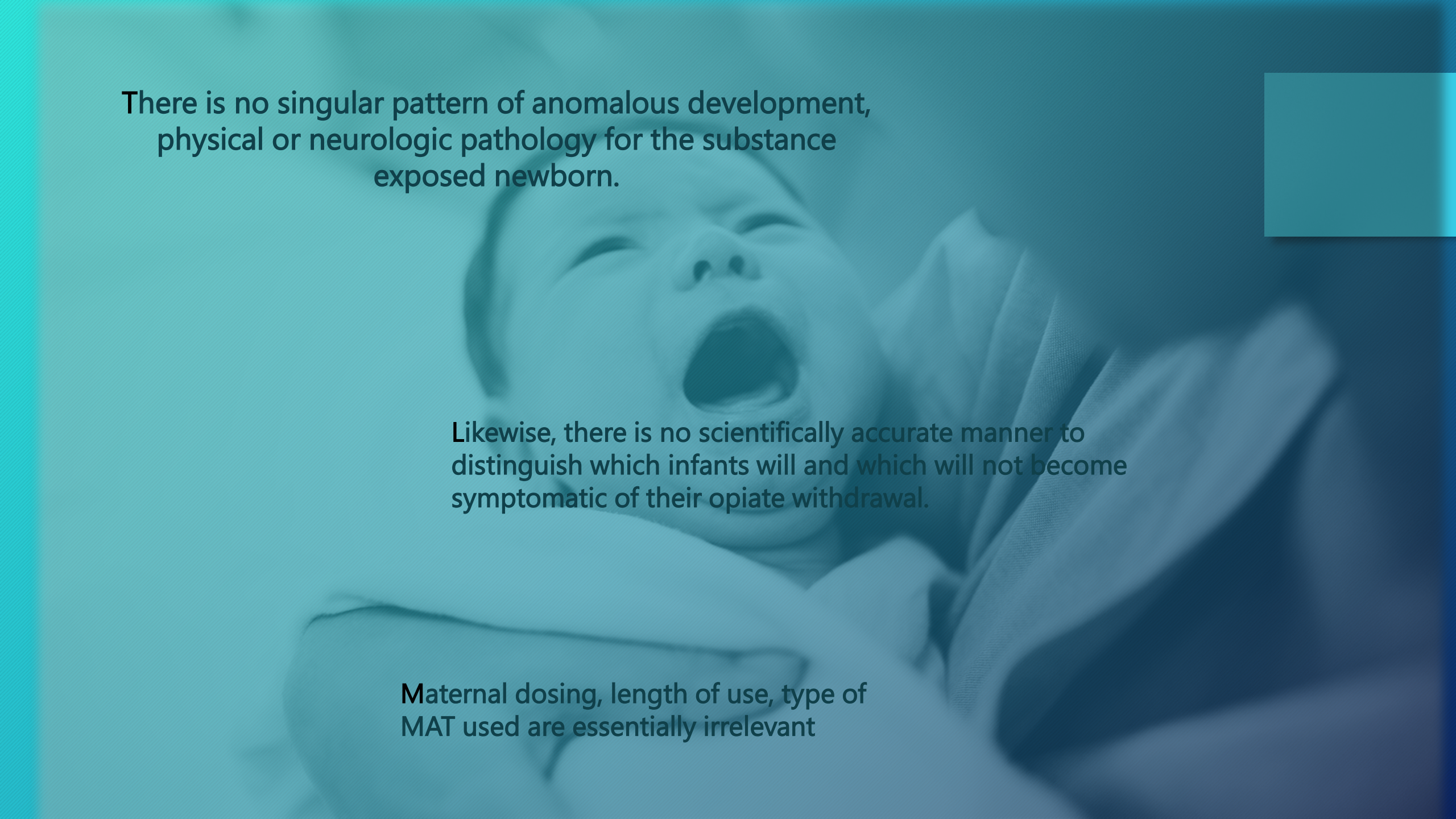
- Risk of stroke / brain infarction.
- May lead to intellectual disability/ Learning delays
- Poor balance
- Hyperactivity
- Decreased attention
- Speech/language delays
- Visual difficulties -strabismus
- Direct teratogenicity

Direct action on the uterus or placenta - placental blood flow;

- Placental vasoconstriction
- Placental insufficiency
- Placental abruption
- Premature birth / miscarriage
- Contractions

Secondary fetal effects - maternal drug use:

- Maternal anxiety / depression / insomnia / abnormal behaviors
- Decreased prolactin release and supply -thus, poor breast milk production.
- Risk of HIV/AIDS-Hepatitis
- Risk of childhood physical / emotional abuse
- Witnessing domestic violence
- Separation from family
- Risk of future incarceration



There is no singular pattern of anomalous development, physical or neurologic pathology for the substance exposed newborn.

Likewise, there is no scientifically accurate manner to distinguish which infants will and which will not become symptomatic of their opiate withdrawal.

Maternal dosing, length of use, type of MAT used are essentially irrelevant

Neonatal Abstinence Syndrome:

---*Neonatal Opioid Withdrawal Syndrome (NOWS)*---

A constellation of physiologic symptoms associated with **OPIATE** withdrawal in a newborn infant.



Neonatal Abstinence Syndrome

Although there can be withdrawal-like symptoms for non-opioids, there is no true syndrome of infantile withdrawal for:

Methamphetamine

Ecstasy/MDMA

Cocaine

GHB

Marijuana

PCP

Benzodiazepines



Neonatal Substance Withdrawal



- Tremor
- Irritability
- Inconsolability
- Poor suck
- Disrupted Suck/swallow/breathe
- **Hypertonia**
- Abnormal Reflex- either exaggerated or altogether absent
- Seizure
- Rapid State Changes
- Inability to maintain sleep state
- Autonomic activation
 - -Lacrimation
 - -Rhinorrhea/nasal stuffiness
 - -Tachypnea
 - -Dilated pupils
 - -Temperature instability/fever
 - -Yawning
 - -Sneezing

Dependent upon

Type of substance

Time of last usage

Maternal substance Hx
Length of exposure

Infant metabolism / hepatic function

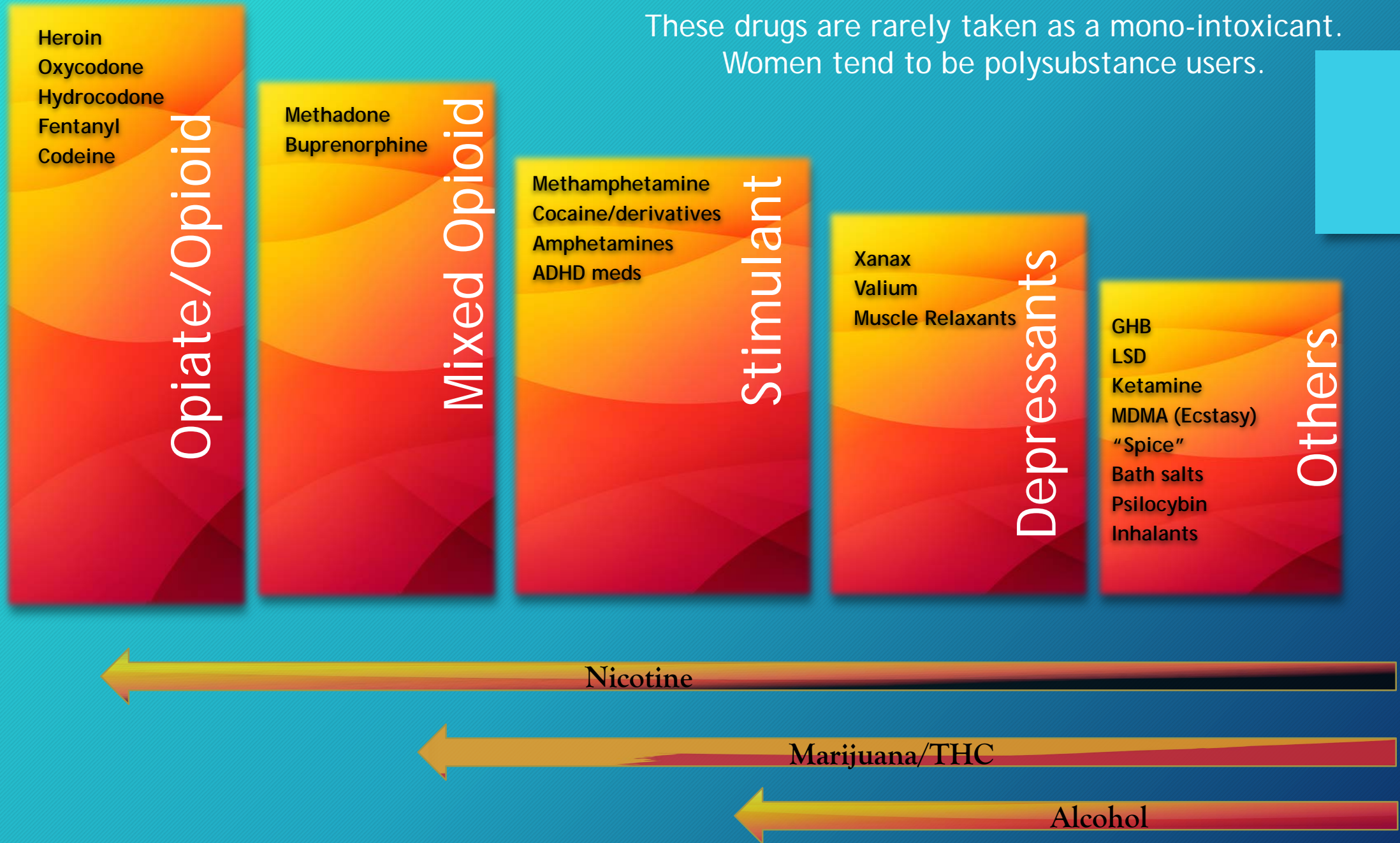
Gestational age

Polysubstance influence

Placental function

Onset of Symptom Expression

These drugs are rarely taken as a mono-intoxicant.
Women tend to be polysubstance users.



Maternal drug use does not occur in isolation

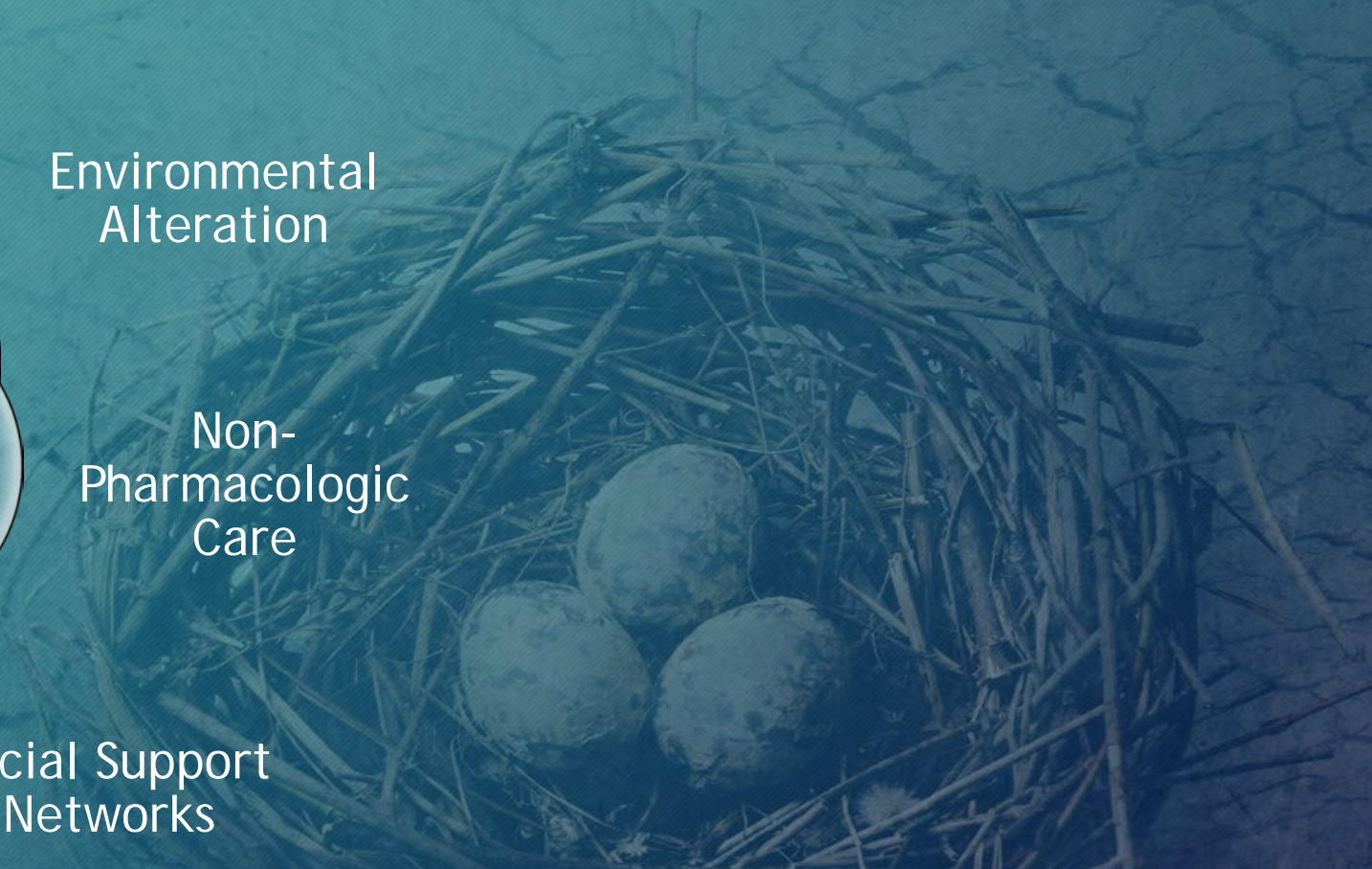
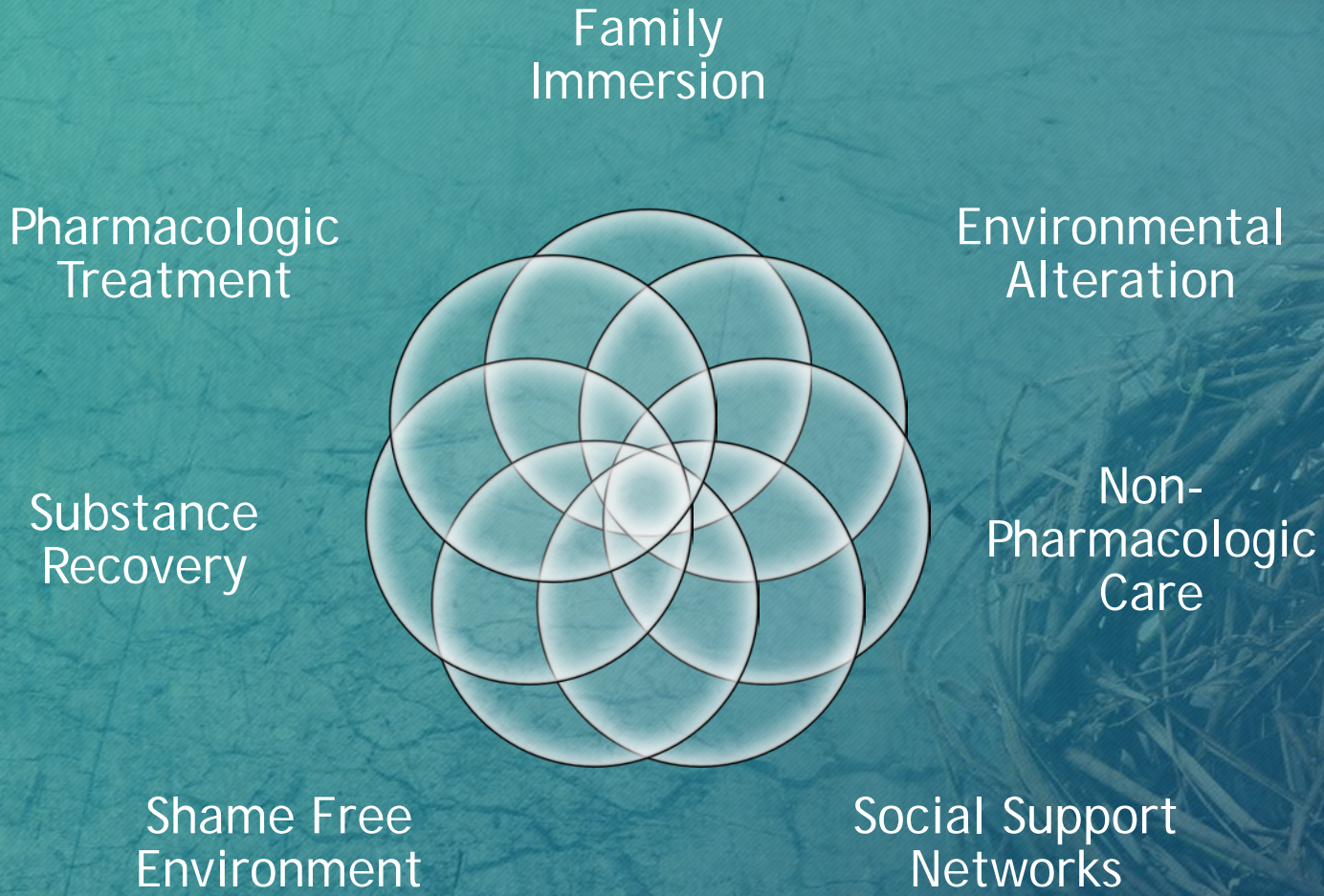
- ❖ Poor general health
 - ❖ Poor nutrition (food insecurity)
 - ❖ Profound social stress
 - ❖ Lack of prenatal care
 - ❖ Poverty
 - ❖ Limited education
-
-



All of these things impact and potentially compromise the neurodevelopmental outcome of children

The NEST Program

A program of perinatal harm reduction and excellence in the care of the substance exposed infant and family.



Treating Infants for Substance Withdrawal

All infants who show evidence of substance withdrawal should be treated for that substance withdrawal





Treatment for Substance Withdrawal is not a commitment into pharmacologic therapy.

Non-Pharmacologic Treatment

Family Education

- Social modeling
- Infant care
- Healthy parenting

Aggressive Comforting Techniques

- Expert Nurses
- Patience
- Skin to skin

Physicality & Handling

- Vertical rocking
- Rhythmic sway
- Supportive flexion

Feeding Measures

- Pacing
- Mechanical aids
- Discoordination

Caregiver Tactics



Non-Pharmacologic Treatment



Non-Pharmacologic Treatment



Pharmacologic Treatment

- Non-pharmacologic measures must continue to be optimized
- Dose to effect
- If unable to wean/maintain control; adjunctive medicines may be required
- Symptoms must be captured
- Once stable; wean aggressively but within symptomatic boundaries

- Polydrug exposure will require more medicine and extended dosing
- Mothers breast milk is a therapeutic adjunct
- Parental participation minimizes need for drugs, allows lower dosing, and allows ORT to be discontinued sooner.



Pharmacologic Care

Opiate Replacement Therapy (ORT)

Treats opiate withdrawal by acting on opioid receptors in the brain

Amount of opiates given is very small

Dosing must be slowly weaned;
Associated with significant length of hospital stay.

Morphine Sulfate

Methadone

Adjunctive Medicines

Phenobarbital

Central nervous system depressant

Clonidine

Inhibits CNS sympathetic outflow and thus limits autonomic overactivity.

Gabapentin

Inhibits the transit of pain and neurologic activity by blocking Ca channel pathways.

It is also felt to have a mild potentiation effects upon opiates.

On the way

Buprenorphine

May be more effective than MS

Speculative decrease length of ORT by up to approximately 40%

Logistical concerns; dosing











Alaska Neonatology Associates · MedNax Medical Group · Anchorage Alaska



Thank you

Questions?